


NUCLEONICA: Mass Activity Calculator

J. Magill/R. Dreher/Z.Soti

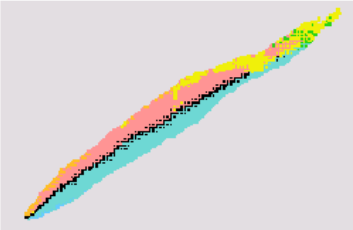
*European Commission, Joint Research Centre,
Institute for Transuranium Elements,
Postfach 2340, 76125 Karlsruhe, Germany*



Nuclear science applications...


 ... web driven nuclear science

ApplicationsMy PreferencesHelp

> Nuclide Explorer

» Actual Chart: Karlsruhe

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Nuclear Data Retrieval



> Application Centre

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Welcome, Joe

Edit PreferencesAdministration

MyCommunity Portal

> My Last Nuclides

- » 90 Th232
- » 90 Th231
- » 94 Pu239
- » 92 U235
- » 25 Mn52

> My Nuclide Mixtures

- » Pu238+daughter (100g @50y)
- » Natural Uranium
- » Cs137 + Ba137m
- » U232+Co60
- » Transuranics in 1 ton Spent Fuel (4.2% enriched, 50GWd/t, 6 years cooling)

> My Sources

- » Pu239 1 g
- » natu

> My Messages

- » Thanks!
- » About my group and information
- » Photo Change
- » Open call for JRC Traineeships at the Institute for Transuranium Elements
- » NAML-9 International Conference on Nuclear Analytical Methods in the Life Sciences

> User Alerts

- » Task completed (DecayEngine: Uranium 238)

Example of a simple NUCLEONICA application: The Mass-Activity Calculator

The screenshot displays the Nucleonica web application interface. The top navigation bar includes links for Applications, My Preferences, Print, and Help (circled in red). The main content area shows the 'Mass Activity Calculator' for '27 Cobalt' (Co60). A small chart displays '10.47 m' and '5.27 y'. Below the chart, there are input fields for Element (Co) and Mass (60), and a 'Mixture selector' icon. Further down, there are input fields for Unit (Grams) and Quantity (1), with an 'Update' button. A table at the bottom lists various units and their corresponding quantities.

Unit | **Quantity**

Grams	1.000
Becquerel	4.187e+13
Curies	1.132e+3
Number of Atoms	1.005e+22
Moles	0.01669
μSv/h (vacuum)	1.411e+7

at 100 cm distance, Threshold energy (γ & X rays) = 15 keV

Help: Mass Activity Calculator

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- 1 Introduction
- 2 Nuclide Selector
- 3 Unit/Quantity Selector
- 4 Unit Conversion
- 5 Simple Decay and the Decay Constant

Introduction

The mass activity calculator is used to convert between the number of atoms, activity (Bq or Ci) and mass (g) for a specific nuclide.

Mass Activity Calculator

27 Cobalt

Actual Chart: Karlsruhe








Element: Co | Mass: 60 | Mixture selector icon

Unit: Grams | Quantity: 1 | Update

Unit | **Quantity**

Grams	1.0000E+00
Becquerel	4.1871E+13
Curies	1.1317E+03
Number of Atoms	1.0048E+22

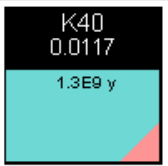
Mass Activity Calculator interface showing the Nuclide Selector, Unit/Quantity selector, and the Unit/Quantity Table.

Logged in as: magill  Networking  Nuclear Science  Search  Forum  **Calculator**  Privacy  Legal

nucleonica ... web driven nuclear

Applications My Preferences Print Help

Version: 2009.10.05



K40
0.0117
1.3E9 y

Mass Activity Calculator

19 Potassium

Current Chart: Karlsruhe

Element: Mass: Mixture selector

Unit: Quantity:

Unit	Quantity
Grams	1.000
Becquerel	2.617e+5
Curies	7.072e-6
Number of Atoms	1.507e+22
Moles	0.02502
μSv/h (vacuum)	5.285e-3

at cm dist

Nucleonica Scientific Calculator - Windows Internet Explorer

http://www.nucleonica.net/Application/calculator.htm

Select and copy result

0

EXP	1/x	x ²	√x	n	()	OFF	AC
SIN	COS	TAN	LN	7	8	9	÷	
x ³	n!	LOG	LOG2	4	5	6	×	=
e	ASIN	ACOS	ATAN	1	2	3	-	
	CONST	CONV	0	.	±	+		

Internet 100%

Exercises! Mass-Activity Calculator

1. Calculate the specific activities of C-14 and S-35?
2. The activity of Sr-90 is 18,000 transformations per minute. What is the mass of Sr-90?
3. 6 g of carbon from a piece of wood found in an ancient temple is analyzed and found to have an activity of 10 transformations per minute per gram (from C-14). How many atoms of C-14 are present in the sample and what is their mass?
4. The concentration of potassium (K) in humans is about 1.7 g/kg. How much potassium does an average person (weight 80 kg) contain? What is the abundance of K-40 in natural potassium?. What is the mass and activity of K-40 in this person?
5. What is the dose rate from a 100 MBq source of Co-60 at 2m distance?



Exercises! Mass-Activity Calculator

1. Calculate the specific activities of C-14 and S-35? ($1.7\text{E}11$ Bq/g (4.5 Ci/g), $1.6\text{E}15$ Bq/g ($4.3\text{E}4$ Ci/g)).
2. The activity of Sr-90 is 18,000 transformations per minute. What is the mass of Sr-90? (Ans. mass = $5.88\text{E}-11\text{g}$).
3. 6 g of carbon from a piece of wood found in an ancient temple is analyzed and found to have an activity of 10 transformations per minute per gram (from C-14). How many atoms of C-14 are present in the sample and what is their mass? ($2.6\text{E}11$ atoms, mass = $6.0\text{E}-12$ g)
4. The concentration of potassium (K) in humans is about 1.7 g/kg. How much potassium does an average person (weight 80 kg) contain? (136 g). What is the abundance of K-40 in natural potassium?. What is the mass and activity of K-40 in this person? (0.0117%, $1.59\text{E}-2$ g, 4.2 kBq).
5. What is the dose rate from a 100 MBq source of Co-60 at 2m distance? (8.4 $\mu\text{Sv/h}$)